THE MICROSCOPIC GERM. WHAT IT IS, AND WHAT IT DOES.

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Abstract from a paper read before the Chautauqua Society of History and Natural Sciences.

WHAT GERMS ARE.

THE FACTS in regard to germ life are startling. The infinity of their numbers, the rapidity of their reproduction, and their all pervasive presence, seem almost incredible. Ten thousand of these may not equal in mass a single grain of wheat, and a cubic inch of the average sewer water, is said to contain 16,000,000 germs. So rapid is the reproduction of germs that a single cell may increase to millions in twenty-four hours.

Within the body are innumerable germs. All animal substances contain them; the very air we breathe, the water we drink and the food we eat, sometimes are swarming with them. It is well known that a large proportion of the nutrition of the body is derived from the atmosphere. The microscopist informs us that the air received into the lungs is charged with germs, and that the breath exhaled, contains them in lessened numbers.

The question now arises: What part do these objects of infinite smallness perform in the human system? Man, as the master product of the creation may be supposed to be perfect in his organization. Whatever constitutes an essential part of the human body, or performs vital functions therein, commands our highest consideration; as the bone, the muscle, the eye, the germ, etc., the *germ*, not less than the *eye*.

A question of the highest import to-day, is,

ARE GERMS HARMFUL?

This question already in part has been answered. Their all pervasive presence and the vital character of their functions, are sufficient evidences of their simplicity and harmlessness. A medical society abroad, which included in its members some of the most distinguished physicians of this, or any other age, after a profound and exhaustive discussion of this subject were unanimous in the

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conclusion that germs are probably conservative in their action. The practical experience of one man in this germ-field, gives the following results of ten years experiments in the study of these objects. Dr. Thomas Powell, of Los Angeles, Cal., a leading physician of the city, has taken desperate chances in the interest of science. He actually has taken into his system during that period, germs asserted to be of the deadliest character. Many of his experiments were made in the presence of physicians. He tells us: "I made the greatest trial of all in the presence of twenty-five physicians. I took first the bacilli of typhoid fever into the stomach, enclosed in gelatine capsules and second, the bacilli of diphtheria both by the vaccination method and by subcutaneous inoculation." The foregoing facts demonstrably prove that certain germs which are classed amongst the most deadly, are simple and harmless..

Dr. Powell further says: "I challenge any one to bring to me the germs of any disease known to the medical profession, and I promise to take them into my system in the presence of any jury of physicians that may be selected; germs that have been cultivated into deadly activity by the usual processes."

Dr. Powell also strongly expresses the opinion that the so-called disease germs, are utterly incapable of successfully assailing the tissues of the human body; that they are not in the least inimical to the life or the health of the human body; that on the contrary it is their peculiar function to *benefit* the human organism.

The inoffensive character of germs may be further shown most strikingly. The river Thames which passes through the midst of London, largely receives the sewage filth of the millions of its inhabitants. Many years ago, "*the Thames river stunk horribly.*" Both cholera and typhoid fever were present, adding consternation to the fears of the inhabitants of the city. The distinguished philosopher, Michael Faraday, tells us: "The water of the river was an opaque brown fluid, and looked like a thick broth; and the feculence seemed to roll up from its surface in dense clouds."

The whole river is practically an immense, open sewer. These waters are carried to and fro through the midst of the city four times a day by the tides, yet, Mr. Faraday further informs us: "Despite the fact that the excretions of millions of people and an indescribable amount and kinds of filth pouring into the Thames, we find no larger proportion of zymotic diseases than in many cities more fortunately situated." The mortality record at that period was even more favorable than for several years immediately preceding.

An instructive lesson in regard to germ life is learned from the waters of the Thames river a few miles below London. Its multitudinous germs and its offensiveness have rapidly disappeared, and its waters are drunk by animals. When its offending particles are permitted to settle, its waters may be used with impunity.

The river Seine, below Paris, gives the same results. A few miles below the city its previously germ-filled waters are found to be more suitable for the supply of ships going on long voyages than that which is taken from wells and springs.

WHAT THE GERM DOES.

The facts embodied in the preceding pages are conclusive in their teachings. We have seen what the microscopic germ *is*, in its nature and its universal presence. What it *does*—the part which it performs, is also clearly manifest. With such a distribution of germs over the whole earth, in such an infinity of numbers, and forms, the inference becomes legitimate, and logical, that the activities of germs, and their usefulness, are in direct ratio with the extent of the field of their presence, and the immensity of their numbers.

They perform infinitely varied functions in vital processes, and in chemical activities, and they have part in vast geological formations. When surrounded by healthy vital tissues, or activities, this diminutive object is neutral. It reveals but little beyond its mechanical presence. But when vitality ceases in its surroundings, then follow its grandest functions. While germs have little to do with living tissues, the vastness, and the character of their pow-

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er, become manifest in the process of *decomposition*.

It is these innumerable and invisible workers which cause organic matter to putrefy, decompose, and fall back into its original elements. Without them all dead bodies would remain undecomposed, unchanged, as if embalmed, and the surface of the globe would be so encumbered with inert matter that all human and animal life would perish from the earth. Thus these wonderful, invisible entities preserve the earth for the use of man.

We have seen that the atmosphere which everywhere surrounds the earth, the waters and all animal and vegetable matters which cover the surface thereof, and the vast formations within its depths, all unite in showing the wonderful ways of these microscopic objects.

HUMAN IMPOSSIBILITIES IN THIS GERM FIELD.

The infinitesimal germ cannot be separated from its surroundings and so isolated and experimented with, as to demonstrably show that a certain describable form of germ is capable of producing a special form of disease. Human processes are too gross and inefficient to determine a matter so delicate and so vital to mankind. Thus, the power to discriminate between germs of such infinite smallness, and to pronounce one to be pathogenic, or disease producing, and another simple and harmless, does not exist in man.

In view of the foregoing statement of facts and legitimate inferences, the endeavor longer to degrade these vital entities to the condition of destroyers of health and life, will be a discredit to the medical profession, and a stigma upon science.

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